CLAIMS

What is claimed is:

1. A single photon read-out circuit comprising:

a feed-back enhanced reset amplifier;

a photodetector connected to an output of the reset amplifier; and

a high-gain amplifier connected to the photodetector.

2. The circuit of Claim 1, wherein the high-gain amplifier comprises:

an adaptive skimming circuit having an integration capacitor..

3. The circuit of Claim 2, further comprising a source follower transistor connected to the output of the input transistor.

4. The circuit of Claim 3, further comprising an access transistor connected between the input transistor and a bus.

5. The circuit of Claim 4, wherein the reset amplifier comprises a CMOS inverter.

6. The circuit of Claim 5, further comprising a reset transistor.

7. The circuit of Claim 6, further comprising a sample-and-hold transistor and a sample-and-hold capacitor.

8. The circuit of Claim 5, wherein the reset amplifier further comprises an autozero transistor, a first capacitor, and a second capacitor.

9. The circuit of Claim 5, wherein the reset amplifier further comprises a current source shared by all pixels on a bus.

10. A focal plane array (FPA) having a plurality of pixel cells, each pixel cell comprising:

a feed-back enhanced reset amplifier;

a photodetector connected to an output of the reset amplifier; and

a high-gain amplifier connected to the photodetector, the high-gain amplifier comprising:

an input transistor;

a current source transistor connected to the input transistor;

a reset transistor connected to the current source transistor; and

an adaptive skimming circuit having an integration capacitor;

wherein the reset amplifier reduces kTC noise, and the high-gain amplifier nulls current associated with the photodetector to reduce signal non-uniformity.

11. An amplifier circuit for single photon read-out of photodetectors in an imaging array, the circuit comprising:

detector means for converting incident light to an input electric signal;

reset amplifier means connected to the detector means for suppressing kTC noise, and

a high-gain amplifier means .connected to the detector means for reducing signal non-uniformity.

12. A single photon read-out circuit comprising:

a detector;

a reset transistor having a drain connected to the detector;

an inverter amplifier connected between the drain of the reset transistor and a source of the reset transistor;

an input transistor having a source connected to the detector;

a current source transistor having a drain connected to a drain of the input transistor; and

an adaptive skimming circuit connected to the current source transistor, the adaptive skimming circuit comprising an integration capacitor.

13. The circuit of Claim 12, further comprising a source follower transistor having a source connected to the drain of the input transistor.

14. The circuit of Claim 12, further comprising a first capacitor connected between the drain of the reset transistor and the photodetector, and a second capacitor connected between the source of the reset transistor and photodetector.

15. The circuit of Claim 14, further comprising a current source, shared by all pixels on a bus, connected to the reset transistor and the inverter amplifier.